REMARKS

Claims 1-40, 42-46, 51, and 53-83 are pending. Claim 1 and Figure 2 are amended. No new matter has been added. The applicant requests reconsideration in light of the following remarks.

1.   Interview Summary

The applicant thanks Examiners Bell and Knight for the in-person interview with the applicant's undersigned representative on April 15, 2005. During the interview, the applicant's representative discussed the rejections under Section 101 of claims 1, 39 and 71, specifically arguing that one skilled in the art would understand the "preparing" and "applying" limitations of claim 1 to refer to actions performed on actual chemical compounds, compositions, etc., for example using known chemical synthesis techniques. The applicant's representative suggested that an amendment along the lines of that submitted above might address the Examiners' concerns.

The applicant's representative also discussed the Section 102 rejection of claim 1 over the Nova reference, and argued that, while the techniques described in Nova could be used to automate and track laboratory experiments in a way that could be useful in implementing the present invention, the reference fails to disclose the receipt from a remote user at a first location of an experiment design that includes electronic data that defines an experiment matrix, starting materials assigned to the elements of the matrix, and process conditions and a screening method to be applied to the matrix elements, the execution at a second location of a set of experiments according to such an experiment design, or the return of experiment results to the remote user. Finally, the applicant's representative also argued that the newly-cited Guinta reference should not be combined with Nova to reject claim 17 under Section 103. No agreement was reached.

2.   Information Disclosure Statements

An Information Disclosure Statement is being filed with this Request for Continued Examination. The applicant notes that another Information Disclosure Statement was filed on October 12, 2004, before the mailing date of the previous Office action. The applicant asks that the Examiner consider the references identified in both of

these statements and return the initialed Form 1449 copies indicating that the references have been considered.

3. Objections to the Drawings

Figure 2 was objected to. A corrected version of Figure 2 is being submitted, along with a marked up copy this drawing showing the changes being made. In Figure 2, reference number 210 has been moved nearer to the inventory subsystem text as requested. The applicant believes that this change addresses all of the grounds for objection and requests that the objections be withdrawn.

4. Rejections under Section 101

Claims 1, 39 and 71 are rejected under 35 U.S.C. § 101 as allegedly being directed to non-statutory subject matter. The Office action states that "[t]he language of these claims (e.g. 'experiment design', 'experimental matrix', 'matrix elements', 'process conditions', 'experimental results', 'library of materials') raise a question as to whether the claims are directed merely to an abstract idea that is not tied to a technological art, environment or machine which would result in a practical application producing a concrete, useful, and tangible result to form the basis of statutory subject matter under 35 U.S.C. 101." Office action at pages 2-3. The Office action then suggests that "if claim 1 was amended to recite a computer-implemented method and required performance of a result outside of a computer, it will be statutory in most cases since use of technology permits the function of the descriptive material to be realized." Office action at page 3.

But as explained in the previous response, claim 1 expressly recites not one, but three concrete actions that must be performed in order to fall within the claim – specifically, the acts of "preparing a first library of materials", "applying the first set of process conditions to the members of the first library of materials", and "applying the first screening method to the members of the first library of materials" to generate experimental results. The applicant respectfully submits that these limitations, which require the chemical/physical preparation, manipulation and observation of *actual materials* --*i.e.*, chemical compositions, such as reagents, substrates, catalysts, stabilizers, additives, solvents, monomers, resins, polymers, supports, zeolites, molecular

sieves, ligands, metal precursors, metal salts, metal oxides, metal complexes and the like (*see* specification at page 8, lines 20-24) -- conclusively take the claim out of the realm of "abstract idea that is not tied to a technological art, environment or machine". Claim 1 has been amended to make this clear, and now recites that "the plurality of members [of the library of materials] contain[] a plurality of actual compounds, compositions, materials or mixtures". Support for the amendment can be found in the passages cited above and in the previous response, as well as at page 12, lines 1-7 of the specification (explaining that the "experiments" to be performed using the claimed invention involve high-throughput technologies, which include the synthesis, processing, analysis or characterization of multiple compounds, compositions, materials or mixtures). The applicant therefore requests that the rejection under section 101 be withdrawn as to claim 1.

The Office action indicates that the rejection under section 101 extends to claims 39 and 71. As noted in the previous response, however, claim 39 has already been amended as suggested to recite a "*computer-implemented* method for obtaining experimental results for a set of experiments". According to the claim, the method includes generating an experiment design that defines starting materials, process conditions and a screening method for a set of experiments, communicating that experiment design to a laboratory, and receiving experimental results obtained at the laboratory by applying the process conditions to a library of materials according to the experiment design and applying the screening method. Claim 71 is expressly directed to a "*computer-readable storage medium tangibly embodying a program*" comprising instructions to perform a method directly analogous to that recited in claim 39. The applicant respectfully submits that these claims clearly indicate both their reliance on computer processes and relationship to the performance of results outside of the computer (application of process conditions and screening methods to actual physical materials to obtain experimental results), and requests that the Section 101 rejections be withdrawn as to these claims as well.

5.   **Rejections under Section 102**

Claims 1-3, 9-16, 24, 26-27, 29, 31-40, 42-45, 51 and, apparently, 71 are rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent No. 6,329,139 ("Nova"). The applicant respectfully disagrees.

a.   **Claims 1-3, 9-16, 24, 26-27, 29, and 31-38**

Claim 1 is directed to a method in which a computer-implemented design tool is provided to a remote user at a first location. The computer-implemented design tool enables the user to generate an experiment design that includes electronic data that defines an experiment matrix having a plurality of matrix elements, one or more starting materials assigned to the matrix elements, and one or more process conditions and a screening method to be applied to the matrix elements.

According to the claimed method, a user input is received at a second location that is remote from the first location. The user input includes an experiment design generated by the experiment design tool. A library of materials is prepared at the second location according to the received experiment design, the specified process conditions are applied to the members of the library of materials to transform at least one of the starting materials into at least one product, and the specified screening method is applied to the members of the prepared library of materials at the second location to generate experimental results. Finally, the experimental results are provided to the remote user at the first location in the form of electronic data describing the results.

Nova discloses an "automatic sorting system", in which "matrices-with-memories" serve as the platform on which manipulations relating to drug discovery protocols are performed or as the repository in which information relating to such manipulations is stored. *See* Nova, Title; Abstract. According to Nova, matrices-with-memories are "[c]ombinations of matrix materials with programmable data storage or recording devices or other memory means". *Id.* at column 4, lines 59-60. These "matrix materials" are solid supports, such as particles, test tubes, or microtiter plates, formed from materials such as glasses, silicates, and polymers such as celluloses, polystyrenes, polysaccharides, and the like. *Id.* at column 6, line 61-column 7, line 5. Nova explains that molecules or biological particles, such as antigens, antibodies, proteins, phages and cells, are associated with the matrix materials – for example, by synthesizing the

molecule on the matrix material support – and the memory associated with the matrix material is used to electromagnetically "tag" the molecule or particle by programming, imprinting or encoding the memory with identifying information. *Id.* at column 5, lines 31-40. These tags can then be used to track the associated molecule or biological particle in subsequent analyses or assays. *Id.* at column 6, lines 23-51; column 14, lines 36-41.

Nova does disclose the use of computer software in the organization, planning and design of chemical experiments using these matrices-with-memories (*see, e.g.*, column 96, lines 4-9), but it does not disclose the use of such software to enable a remote user to generate an experiment design that includes electronic data that defines an experiment matrix, starting materials, process conditions and screening methods, as claim 1 requires. The Office action cites the following portions of Nova as allegedly disclosing this portion of the claim: Figure 35; the Abstract; column 2, lines 3-31; and column 186, lines 33-43. *See* Office action, page 4. But the cited portions of Nova merely describe various apparatus and techniques for sorting and tracking chemical processes using the disclosed matrices-with-memories, and do not disclose, either explicitly or inherently, the specific features recited in the claim.

Figure 35 of Nova shows a "read/write station" that includes a computer system coupled to a carousel configured to accommodate a number of sample tubes that can be fitted with "sleeves" that contain programmable memory, which sleeves "thereby permit[] the tube to be tracked and information about the contents, source or other . . . information, to be stored". *See* Nova, Fig. 35; column 24, lines 40-41; column 137, lines 24-58. As noted above, the Abstract discloses that the matrices-with-memories (which apparently include the vials/sleeves described in the context of Figure 35) "serve as the platform on which all manipulations are performed or serve as the repository of information that is transferred to other memories as the synthesized compounds are processed and screened", which, the Abstract states, "provide[s] a means for seamless data tracking". Nova, Abstract, lines 2-8. The next cited passage, at column 2, lines 3-31, includes the statement of the Field of the Invention, which merely states that the invention involves "the application of information and data storage and retrieval technology to drug discovery, including molecular tracking and identification and to biological, chemical, immunological and biochemical assays", which "permit[s] synthetic

chemistry to be linked to analysis and high throughput screening on the same platform with seamless informatics management". *Id.* at column 2, lines 3-10. This passage also includes the first paragraph of the "Background" section, which generally describes the application of high-throughput screening protocols in the filed of drug discovery. And the last passage cited as allegedly disclosing the first limitation of the claim includes a brief description of a specific set of fluorescence screening experiments performed using a mixture of fluorescent markers. *See* Nova, column 186, lines 33-43. Noticeably absent from any of these passages is any disclosure of the provision of a computer-implemented experiment design tool that is capable of generating an experiment design that includes electronic data that defines an experiment matrix, starting materials assigned to elements of the experiment matrix, and process conditions and a screening method to be applied to the matrix elements, as claim 1 requires.

Nor does Nova disclose the receipt of such an experiment design from a user at one location and the execution of the experiment design by a research laboratory at a second, different location as claim 1 requires. Regarding receipt of an experiment design, the Office action cites column 5, lines 31-40 and column 95, lines 38-48 of Nova. But these passages disclose that molecules or particles associated with matrices-with-memories can be tagged by programming the associated memory or imprinting or encoding the matrix itself (column 5, lines 31-40) and a manual sorting system that includes devices and software for reading from and writing to matrices with memories, including for assisting the user in identifying a particular matrix-with-memory and the destination to which the matrix-with-memory is to be transferred (column 95, lines 38-48). The applicant respectfully submits that nothing in the cited passages discloses the receipt from a first location of an experiment design that includes electronic data defining an experiment matrix, starting materials, processing conditions and a screening method, as recited in the claim.

Regarding the execution of such an experiment design, the Office action cites a generic discussion of combinatorial libraries (column 2, line 51-column 3, line 37), a description of the operation of a specific optical memory based on photochemical changes to bacteriorhodopsin (column 81, lines 43-60), and the "augmentation" of conventional containers (*e.g.*, vials, plates, *etc.*) and laboratory instruments with

programmable memories to provide for sample tracing and intra-device communication (column 13, line 47-column 14, line 5). The applicant submits that nothing in these passages discloses the preparation, processing and screening of a library of materials according to a received experiment design as the claim requires.

Finally, regarding the last limitation of the claim the Office action cites a discussion of a technique for programming a memory associated with a container (column 143, line 44-column 144, line 1). This passage does not disclose the provision of electronic data describing experimental results to the remote user, as the claim expressly requires.

Because it does not disclose every limitation of claim 1, Nova cannot anticipate that claim, or dependent claims 2, 3, 9-16, 24, 26-27, 29 and 31-38, all of which depend directly or indirectly from claim 1 and therefore include all of the limitations of that claim. The rejection under 35 U.S.C. § 102(e) as to these claims should therefore be withdrawn.

b.   Claims 39-40

Claim 39 is an independent claim directed to a computer-implemented method for obtaining experimental results for a set of experiments. The method includes the steps of generating at a first location an experiment design that defines a set of experiments, communicating the experiment design to a laboratory at a second location for execution, and receiving at the first location experimental results obtained by execution of the set of experiments at the laboratory. As in claim 1, the experiment design includes an experiment matrix, one or more starting materials assigned to the matrix elements, and one or more process conditions to be applied to the matrix elements, such that each of a plurality of matrix elements being defined by a unique combination of starting materials and/or process conditions. The claim also specifies that the experiment design also defines a screening method to be applied to generate the experimental results.

Claim 39 thus includes limitations analogous to those discussed above in the context of claim 1 (albeit from the perspective of the user, as opposed to the laboratory as in claim 1); accordingly, claim 39 and dependent claim 40 are allowable for at least the reasons discussed above in the context of that claim.

c.   **Claims 42-45**

Claims 42-45 are dependent claims based directly on claim 39, and therefore include all of the limitations of that claim. The applicant submits that these claims are allowable over Nova for at least the same reasons discussed above.

d.   **Claim 51**

Claim 51 is an independent claim directed to a computer-readable storage medium tangibly embodying a research system program comprising instructions operable to cause a programmable processor to perform a sequence of steps directly analogous to the method steps recited in claim 1. Accordingly, the applicant submits that claim 51 is allowable over Nova for at least the reasons discussed above in the context of claim 1.

e.   **Claim 71**

As noted above, Claim 71 is directed to a "computer-readable storage medium tangibly embodying a program" comprising instructions to perform a method directly analogous to that recited in claim 39. Accordingly, the applicant submits that claim 71 is allowable over Nova for at least the reasons discussed above in the context of claim 39.

6.   **Rejections under Section 103**

Claims 4-8, 17-23, 25, 28, 30 and 46 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable in light of various combinations of Nova with U.S. Patent No. 5,569,799 ("Chen"), U.S. Patent No. 5,969,121 ("Allen"), U.S. Patent No. 5,849,578 ("Falb"), U.S. Patent No. 4,710,864 ("Li"), U.S. Patent No. 5,737,494 ("Guinta"), and William J. Lennon *et al.*, "Using a Distributed Mini-computer Network to Automate a Biochemical Laboratory" (publication information unknown) ("Lennon"). The applicant respectfully disagrees.

a.   **Claims 4-8**

Claims 4-8 are dependent claims based on claim 1. In addition to the limitations of their base claim, these claims add the limitations that the first experiment matrix includes at least 50 (claim 4), at least 96 (claim 5), or at least 1000 elements (claims 6-8), and that experimental results are provided to the user within 50 (claim 6), 20 (claims 4 and 7) or 10 days (claims 5 and 8) from preparation of the first library.

These claims are rejected based on a combination of Nova, Li, and Falb. Nova is cited for its alleged disclosure of the limitations of claim 1. Li is cited for the alleged disclosure of experiment matrices including at least 50, at least 96, or 127 or more elements and of a variable amount of time before experimental results are available". Falb is cited for the alleged disclosure of providing experimental results to a user within 10, 20 or 50 days. As noted above, however, Nova fails to disclose, and also fails to suggest, every limitation of claim 1 – for example, the provision of experiment design software to a user at a first location and the receipt and execution at a second location of an experiment design generated using such software, or the generation of an experiment design that meets the limitations of that claim. The Office action does not contend that either Li or Falb discloses or suggests these features. Because the cited combination thus fails to disclose or suggest at least these features of the claims, the applicant submits that no *prima facie* showing of obviousness has been established. Claims 4-8 should therefore be allowed.

b.   Claims 17-21

Claim 17 is a dependent claim based on claim 1, and recites that the method comprises the additional steps of evaluating the first experiment design to generate an experimental plan describing a proposed execution of the set of experiments; providing the experimental plan to the remote user; and receiving an input from the user in response to the experimental plan. According to the claim, the steps of preparing the library of materials, the applying the process conditions, applying the screening method, and providing the experimental results are only performed when the user approves of the experimental plan. Claims 18-21 depend directly or indirectly from claim 17 and provide additional details regarding the evaluation by which the experimental plan is generated.

These claims are rejected based on a combination of Nova and Guinta. Nova is cited for its alleged disclosure of the limitations of claim 1, and for such additional limitations as "evaluating the first experiment design . . . to generate an experimental plan" and "providing the experimental plan to the remote user" (claim 17), "generating an estimate of time and/or cost to perform the set of experiments" (claim 18), "determining whether the design conforms to a set of experimental parameters" (claim 19), "determining whether the assigned starting materials . . . are present in an inventory of

materials" (claim 20), and "determining whether the assigned starting materials have chemical or physical properties falling within a predetermined set of chemical or physical properties" (claim 21). Guinta is cited for the alleged disclosure of "receiving an input from the user in response to the experimental plan" as recited in claim 17. As noted above, however, Nova fails to disclose, and also fails to suggest, every limitation of claim 1 – for example, the provision of experiment design software to a user at a first location and the receipt and execution at a second location of an experiment design generated using such software, or the generation of an experiment design that meets the limitations of that claim. Moreover, even assuming Nova discloses the generation and use of an experiment design as recited in claim 1 (which it does not, as discussed above), the reference does not disclose, or even suggest, the step of evaluating such an experiment design to generate an experimental plan, the provision of such an experimental plan to the user, or the conditioning of the execution of the experiment upon the approval of such an experimental plan by the user. The Office action does not contend that Guinta discloses or suggests these features. Because the cited combination thus fails to disclose or suggest at least these features of the claims, the applicant submits that no *prima facie* showing of obviousness has been established. Claims 17-21 should therefore be allowed.

c.   **Claims 22-23**

Claims 22 and 23 are dependent claims based directly or indirectly on claim 1. In addition to the limitations of that claim, claim 22 recites that the computer-implemented experiment design tool is configured to enable the remote user to generate an experiment request for execution of the set of experiments defined by the first experiment design for submission over a computer network, where the experiment request includes electronic data embodying the first experiment design. Claim 23 depends from claim 22 and provides that the first experiment design is received from the remote user over a computer network.

These claims are rejected based on a combination of Nova and Lennon. Nova is cited for its alleged disclosure of the limitations of claim 1. Lennon is cited for its alleged disclosure of the generation and submission of experiment requests over a computer network.

As noted above, however, Nova fails to disclose, and also fails to suggest, every limitation of claim 1 – for example, the provision of experiment design software to a remote user at a first location and the receipt and execution at a second location of an experiment design generated using such software, or the generation of an experiment design that meets the limitations of that claim. As discussed in the previous response, Lennon also fails to disclose or suggest at least these features of claim 1. Because the cited combination thus fails to disclose or suggest every limitation of the claims, the applicant submits that no *prima facie* showing of obviousness has been established. Claims 22 and 23 should therefore be allowed.

d. Claims 25 & 28

Claims 25 and 28 are dependent claims based directly or indirectly on claim 1. In addition to the limitations of that claim, claim 25 recites that the first experiment design defines a set of experiments directed to chemicatalysis or biocatalysis. Claim 28 recites that the first experiment design defines a set of experiments directed to optimization of a chemical synthetic process (from claim 26) and that the set of experiments is directed to the preparation of fine chemicals.

These claims are rejected based on a combination of Nova and Allen. Nova is cited for its alleged disclosure of the limitations of claim 1. Allen is cited for its alleged disclosure of experiments directed to chemicatalysis or biocatalysis (for claim 25) and fine chemicals (for claim 28).

As noted above, however, Nova fails to disclose, and also fails to suggest, every limitation of claim 1 – for example, the provision of experiment design software to a user at a first location and the receipt and execution at a second location of an experiment design generated using such software, or the generation of an experiment design that meets the limitations of that claim. The Office action does not contend that Allen discloses or suggests these features. Because the cited combination thus fails to disclose or suggest at least these features of the claims, the applicant submits that no *prima facie* showing of obviousness has been established. Claims 25 and 28 should therefore be allowed.

e.   **Claim 30**

Claim 30 is a dependent claim based on claim 1 and claim 26. In addition to the limitations of those claims, claim 30 recites that the set of experiments is directed to the preparation of commodity chemicals.

Claim 30 is rejected based on a combination of Nova and Chen. Nova is cited for its alleged disclosure of the limitations of claim 1. Chen is cited for its alleged disclosure of experiments directed to the preparation of commodity chemicals.

As noted above, however, Nova fails to disclose, and also fails to suggest, every limitation of claim 1 – for example, the provision of experiment design software to a user at a first location and the receipt and execution at a second location of an experiment design generated using such software, or the generation of an experiment design that meets the limitations of that claim. The Office action does not contend that Chen discloses or suggests these features. Because the cited combination thus fails to disclose or suggest at least these features of the claims, the applicant submits that no *prima facie* showing of obviousness has been established. Claim 30 should therefore be allowed.

f.   **Claim 46**

As amended, claim 46 is a dependent claim based on claim 39. In addition to the limitations of that claim, claim 46 recites that the experiment design is communicated to the laboratory over a computer network.

Claim 46 is rejected based on a combination of Nova and Lennon. Nova is cited for its alleged disclosure of the limitations of claim 39. Lennon is apparently cited for its alleged disclosure of the communication of experiment designs over a computer network.

As noted above, however, Nova fails to disclose, and also fails to suggest, every limitation of claim 39 – for example, the generation of an experiment design by a remote user at a first location, the communication of such an experiment design to a laboratory at a second, different location for execution, and the receipt at the first location of experimental results obtained by execution of the experiment design at the laboratory, as claim 39 requires, or the generation of an experiment design that meets the limitations of that claim. As discussed in the previous response, Lennon also fails to disclose or suggest at least these features of claim 39. Because the cited combination thus fails to disclose or suggest at least these features of the claim, the applicant submits that no *prima*

facie showing of obviousness has been established. Claim 46 should therefore be allowed.

7.   Claims 53-70 & 72-83

Claims 53-58 are dependent claims based directly or indirectly on claim 39, and include limitations analogous to those recited in claims 17, 19, 20, 21, 9 and 35, respectively. The Office action states that these claims "are rejected for being dependent on rejected independent claim 39 as well as for reasons given in this and in the prior office action(s)." The applicant submits that to the extent the rejection of these claims is based on the same grounds as for the corresponding analogous claims, these claims are allowable for reasons discussed above.

Claims 59-70 are dependent claims based directly or indirectly on claim 51, and include limitations analogous to those recited in claims 9-17, 35, and 37-38, respectively. The Office action states that these claims "are rejected for being dependent on rejected independent claim 51 as well as for reasons given in this and in the prior office action(s)." The applicant submits that to the extent the rejection of these claims is based on the same grounds as for the corresponding analogous claims, these claims are allowable for reasons discussed above.

Claims 72-83 are dependent claims based directly or indirectly on claim 71, and include limitations analogous to those recited in claims 17, 40, 19-21, 42-46, 9 and 35, respectively. The Office action states that these claims "are rejected for being dependent on rejected independent claim 71 as well as for reasons given in this and in the prior office action(s)." The applicant submits that to the extent the rejection of these claims is based on the same grounds as for the corresponding analogous claims, these claims are allowable for reasons discussed above.

8.   Conclusion

The applicant submits that all claims are now in condition for allowance. Please apply any charges or credits to Deposit Account No. 50-0496.

                                            Respectfully submitted,

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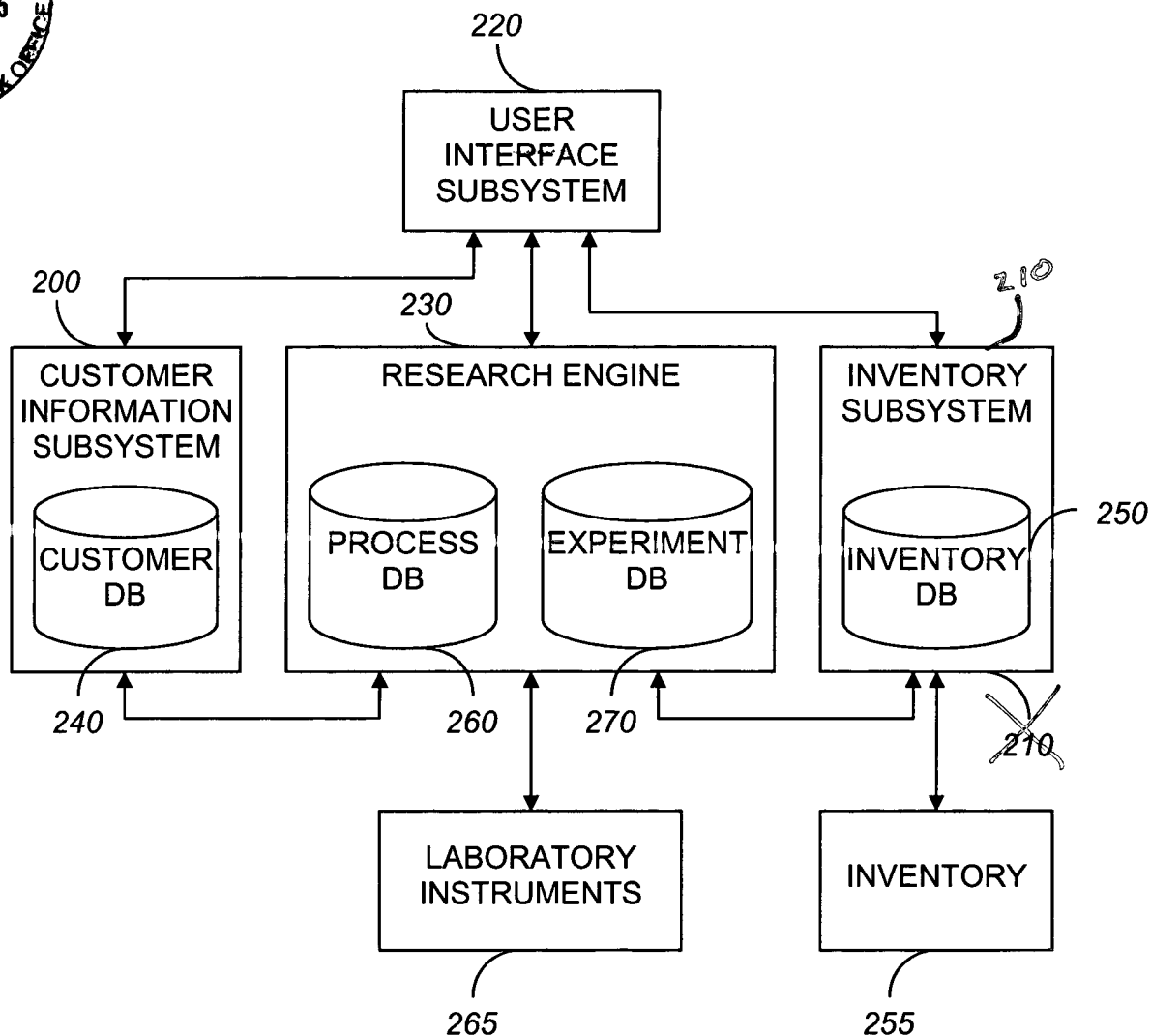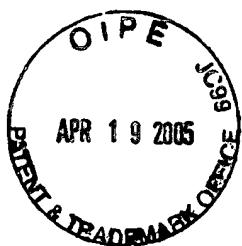
ANNOTATED MARKED-UP DRAWINGS

FIG. 2